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The Relationship Between Uncertainty and Desire for Feedback: A Test of Competing Hypotheses[1]

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The relationship between uncertainty and desire for feedback was investigated in 2 studies. Results of Study 1 showed support for a curvilinear relationship. People were interested in feedback at high and low levels of uncertainty, as opposed to moderate levels of uncertainty, indicating the activation of both uncertainty reduction and self-verification motives. In Study 2, the curvilinear relationship with uncertainty was replicated for indirect feedback-seeking behavior. In contrast, we found a negative relationship between direct feedback seeking and uncertainty, moderated by certainty orientation. People seemed more motivated by self-verification vs. uncertainty reduction strivings, depending on their certainty orientation. These findings suggest that the relationship between uncertainty and desire for feedback is less simple than previously thought.

The past two decades of research in the domain of performance feedback have demonstrated that employees in organizations are more than passive recipients of feedback. Employees have a genuine interest in obtaining feedback and initiate a wide range of actions to acquire feedback about their performance (for a review, see Ashford, Blatt, & VandeWalle, 2003). Employees seek feedback either by directly asking their supervisors for feedback (inquiry) or by observing their environments and others for cues that might serve as feedback information (monitoring). By seeking feedback, employees can better assess their capabilities (Williams & Johnson, 2000), adjust their goal-directed behavior (Morrison & Weldon, 1990), "learn the ropes" of a new job (Morrison, 1993), and improve their performances (Renn & Fedor, 2001).

Research has shown that, when considering seeking feedback, employees constantly balance their desire for feedback against the costs associated with

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seeking feedback (e.g., hearing negative feedback about oneself, exposing one's uncertainty to colleagues). When desire for feedback exceeds cost perceptions, people proceed to action and actually seek feedback (Ashford & Cummings, 1985; VandeWalle & Cummings, 1997). Scholars have proposed that employees' feelings of uncertainty are the primary determinant of desire for feedback (Ashford & Cummings, 1983; Ashford et al., 2003; Morrison, 2002; Morrison, Chen, & Salgado, 2004). This is in line with uncertainty reduction theory, which predicts that people have an aversion to uncertainty and will gather information to reduce uncertainty feelings. Although uncertainty reduction generally is acknowledged as one of the main motives driving desire for feedback, little empirical or theoretical work has focused directly on the role of uncertainty in determining desire for feedback (Morrison, 2002; Tuckey, Brewer, & Williamson, 2002).

The present study challenges the traditional perspective of uncertainty reduction in feedback-seeking research. Specifically, the basic premise of this study is that the relationship between uncertainty and desire for feedback is less simple than previously thought. From a conceptual point of view, we draw on recent developments in the broader domain of self-motives in social psychology (Bernichon, Cook, & Brown, 2003; Morling & Epstein, 1997; Sedikides & Strube, 1997) to identify different theoretical perspectives about the relationship between uncertainty and desire for feedback. Each of these different theoretical perspectives makes different predictions about the relationship between uncertainty and desire for feedback. As we had no a priori expectations about which theory would be supported, we stated and systematically tested competing hypotheses (e.g., Dunnette, 1966). To test these competing hypotheses, two empirical studies in different contexts were conducted.

Theoretical Background

Uncertainty Reduction Theory

Uncertainty reduction has been identified as the leading motive behind the study of feedback seeking in organizations and as the direct precursor of desire for feedback (Levy, Albright, Cawley, & Williams, 1995; Morrison, 1995, 2002). For instance, in a cross-sectional field study, Ashford and Cummings (1985) found that when employees experienced a great deal of uncertainty (as reflected by their role ambiguity and contingency uncertainty), they sought more feedback.

More indirect empirical evidence comes from research on organizational socialization. As a result of changes in expectations and needed skills, newcomers in organizations often struggle with uncertainty. Hence, they seek

more feedback to reduce these high levels of uncertainty (Ashford & Black, 1996; Brett, Feldman, & Weingart, 1990; Wanberg & Kammeyer-Mueller, 2000). Following the same line of thought, some studies have shown that more experienced and tenured employees suffer less from uncertainty and thus seek less feedback (Ashford, 1986; Ashford & Cummings, 1985; Brown, Ganesan, & Challagalla, 2001; VandeWalle, Ganesan, Challagalla, & Brown, 2000).

The uncertainty reduction motive in feedback seeking is also echoed in the self-assessment motive in the self-motives domain in social psychology (Sedikides, 1993; Sedikides & Strube, 1995). According to self-assessment theory, people are motivated to obtain an accurate evaluation of the self. Therefore, people are predominantly interested in the diagnosticity of self-relevant information; that is, the extent to which information can reduce uncertainty about an aspect of the self (for a review of empirical evidence, see Sedikides & Strube, 1997). In sum, self-assessment theory predicts—like uncertainty reduction theory—that individuals' desire for feedback is motivated by reduction of uncertainty.

> *Hypothesis 1a*. There will be a positive relationship between uncertainty and desire for feedback.

Self-Verification Theory

Self-verification theory suggests that people are motivated to maintain consistency between their self-views and new self-relevant information. According to self-verification theory, people work to confirm their self-conceptions because of a wish for psychological coherence and feelings of control and stability in their social environment (Swann, Rentfrow, & Guinn, 2002; Swann, Stein-Seroussi, & Giesler, 1992). First, self-verifying information is comforting because it convinces and reassures people that they know themselves and their environments. Second, self-verifying information means that individuals' social partners perceive them "correctly" and that these partners will treat them in familiar and understandable ways.

More specifically, this theory predicts that the more an individual is certain of a particular self-perception, the more that individual will work at verifying and maintaining that self-perception (Chen, Chen, & Shaw, 2004; Pelham, 1991; Pelham & Swann, 1994; Swann & Pelham, 2002). As people acquire more information concerning their perceptions about themselves and the environment, they become more certain about these self-perceptions. After time, these certain and stable self-perceptions are a prerequisite to preserve order and stability for the self in the environment. Therefore, people

are motivated to maintain consistency between these firmly held self-perceptions and new self-relevant information. One way of preserving this consistency consists of soliciting self-verifying feedback (Bosson & Swann, 1999; Sanitioso & Wlodarski, 2004; Swann, Pelham, & Krull, 1989). In sum, self-verification predicts that people desire feedback to confirm perceptions that are held with high certainty, and thus will have a high desire for feedback when uncertainty is low.

Although uncertainty reduction has been the main motive researched in feedback-seeking research, close inspection of the feedback-seeking literature also reveals a couple of findings that are inconsistent with uncertainty reduction theory and are consistent with self-verification theory. For instance, in contrast to the hypothesized positive relationship between uncertainty and feedback seeking, Fedor, Rensvold, and Adams (1992) found that in a longitudinal field study, helicopter pilot trainees in the Army experiencing high levels of feedback-related uncertainty sought less direct feedback from their instructor pilots. Several other studies using cross-sectional field studies also have reported significant negative correlations between self-reported uncertainty and inquiry (Ashford, 1986; Fedor et al., 1992) and self-reported uncertainty and monitoring (Ashford, 1986; Gupta, Govindarajan, & Malhotra, 1999), indicating that high levels of uncertainty sometimes lead to less feedback seeking. Until now, little attention has been paid to these findings disconfirming uncertainty reduction theory.

> *Hypothesis 1b*. There will be a negative relationship between uncertainty and desire for feedback.

Uncertainty Reduction and Self-Verification Theory

The third theoretical perspective reconciles both previous theories. This perspective posits that both uncertainty reduction and self-verification motives can drive desire for feedback. When employees are highly certain about their perceptions about appropriate behavior in the organization, they desire feedback to verify these perceptions. However, when employees are highly uncertain about behavior that is deemed appropriate in the organization, they also desire feedback to reduce uncertainty about these views.

When employees are moderately uncertain about their perceptions, neither of the motives (i.e., uncertainty reduction and self-verification) is activated, so employees desire less feedback. So, a key conceptual point of this perspective is that people can try to satisfy both motives when they seek feedback. This proposition is consistent with recent research on self-motives in social psychology.

Several studies have demonstrated that people often try to satisfy different and opposite motives at the same time when dealing with feedback. For instance, Katz and Beach (2000) examined the effects of self-verifying and self-enhancing feedback on initial attraction toward romantic partners. In this study, participants provided self-descriptions and later received feedback from their potential partners. It appeared that participants were most attracted to partners who provided both self-enhancing and self-verifying feedback, and were significantly less attracted to partners who provided either self-verifying or self-enhancing feedback alone. Several other studies have reported similar patterns, suggesting that people strive to reconcile different motives (Bernichon et al., 2003; Campbell, 2005; Morling & Epstein, 1997; Sedikides, 1993; Swann et al., 1989).

Although conceptually meaningful, no studies in the feedback-seeking literature have actually tested for a curvilinear relationship between uncertainty and feedback seeking. However, we did find evidence for a curvilinear relationship in the information-seeking literature. Boynton, Gales, and Blackburn (1993) examined information-seeking behavior of managers and found support for a curvilinear relationship. The highest levels of search activity were observed when uncertainty was either high or low. At intermediate levels of uncertainty, managers engaged in less search activity. All of this leads to the following hypothesis:

> *Hypothesis 1c*. There will be a curvilinear relationship between uncertainty and desire for feedback. Desire for feedback will be higher at low and high levels of uncertainty, as opposed to intermediate levels of uncertainty.

Integrating Uncertainty Reduction and Self-Verification

Recent research on self-motives in social psychology has moved beyond broad questions such as "Do each of these self-motives exist?" and "Which of these motives is dominant in predicting attitudes and behavior?" acknowledging a more complicated interplay between the different motives. This is reflected in questions such as "Under what circumstances do the motives operate?" and "Who are the people in whom a given motive is more prevalent than other motives?" (Sedikides & Strube, 1995, 1997).

Whereas situational variables have been researched primarily as possible moderators (e.g., Dunning, 1995; Sedikides, Herbst, Hardin, & Dardis, 2002; Tice, Butler, Muraven, & Stillwell, 1995), recent social psychological studies have proposed that individual-difference variables might moderate the activation of self-assessment and self-verification motives (Roney & Sorrentino,

1995; Sedikides & Strube, 1997). Depending on individual differences, some people might be motivated more by uncertainty-reduction strivings, whereas other people might be motivated more by self-verification strivings. To date, the role of these individual-difference variables has remained unexplored.

In the past, several individual-difference variables have been linked to feedback-seeking behavior. For instance, a number of studies have found that a learning goal orientation to develop competence by acquiring new skills and mastering new situations is highly predictive of the frequency of feedback-seeking behavior (Tuckey et al., 2002; VandeWalle & Cummings, 1997; VandeWalle et al., 2000). To date, however, very few studies have examined how individual-difference variables relate to specific self-verification or uncertainty-reduction strivings. The current study tests two individual-difference variables as possible moderators of the relationship between uncertainty and desire for feedback; namely, need for closure and certainty orientation. These specific individual-difference variables were chosen because we expected them to be conceptually related to the uncertainty-reduction or self-verification motive.[3]

Kruglanski (1989) introduced the concept of *need for closure* as the desire for "an answer on a given topic, any answer, as compared to confusion and ambiguity" (p. 14). Need for closure reflects the desire for clear, definite, or unambiguous knowledge that will guide perception and action, as opposed to the undesirable alternative of ambiguity and confusion (for a review, see Kruglanski & Webster, 1996). Hence, people with high need for closure typically show an aversion for high-uncertainty situations and have been found to engage in various activities in order to reduce this uncertainty across different contexts. For instance, Ellis (1996) examined the influence of need for closure on preferences for receiving information in a job interview setting among female secretarial job applicants. The results showed that under experimentally induced high need for closure, job applicants requested more job information, as opposed to under situations of low need for closure. Similarly, a recent experimental study showed that consumers with high need for closure seek more information in novel purchase situations to reduce uncertainty (Vermeir, Van Kenhove, & Hendrickx, 2002). We expect that the same will happen with desire for feedback and that especially people with high need for closure will have more desire for feedback when uncertainty is high.

[3]It should be noted that the fourth theoretical perspective (i.e., "The relationship between uncertainty and desire for feedback will be moderated by individual-difference variables.") does not need to invalidate the previous hypotheses. It is possible that a linear or curvilinear relationship in the population reflects different individual-difference profiles. Therefore, the individual-difference hypotheses were not described as competing hypotheses.

Hypothesis 2a. Need for closure will moderate the pattern of the relationship between uncertainty and desire for feedback. Employees with high need for closure will have more desire for feedback when uncertainty is high and less desire for feedback when uncertainty is low than will people with low need for closure.

Whereas the first variable (need for closure) was linked theoretically to uncertainty reduction, we related the second variable (certainty orientation) to self-verification. *Certainty orientation* is conceptualized as a general orientation toward approaching and dealing with information. Sorrentino, Short, and Raynor (1984) proposed that certainty-oriented people are motivated primarily to avoid ambiguity by maintaining existing beliefs.

Roney and Sorrentino (1995) reviewed a number of studies suggesting that self-verification is an important motive for certainty-oriented people. For instance, they described an experiment by Sorrentino and Hewitt (1984) examining the role of certainty orientation using a paradigm that allows the identification of self-assessment and self-enhancement motives. In this paradigm, subjects received feedback about an initial test indicating either they were not low in ability but it was unknown whether they were high or moderate (i.e., ascending condition) or that they were not high but it was uncertain whether they were low or moderate (i.e., descending condition). Subjects then were asked to construct a new test, choosing among items that were diagnostic either of high ability (i.e., ascending items), of low ability (i.e., descending items), or were not explicitly diagnostic of either (i.e., constant items).

Sorrentino and Hewitt (1984) found that people high in certainty orientation chose fewer diagnostic than nondiagnostic items in both conditions. For example, in the ascending condition, they chose more items differentiating low versus moderate ability, even though they had been told already that they were not low in ability. In short, this study suggests that certainty-oriented people—choosing more items that confirmed what they had learned already—are more motivated by self-verification concerns (Roney & Sorrentino, 1995). If people with high certainty orientation are more motivated by self-verification strivings, we expect them to have more desire for feedback when uncertainty is low than people with low certainty orientation. Thus, we expect that certainty orientation will interact with uncertainty to predict desire for feedback.

Hypothesis 2b. Certainty orientation will moderate the pattern of the relationship between uncertainty and desire for feedback. Employees with high certainty orientation will have more desire

for feedback when uncertainty is low and less desire for feedback when uncertainty is high than will people with low certainty orientation.

Study 1

In Study 1, we examine industrial/organizational (I/O) psychology students' desire for feedback after they complete a computerized in-basket exercise. Participants indicate their desire for feedback about a number of performance dimensions (competencies) from the computer without interference from other individuals.

In organizations, developmental feedback typically is built around specific performance dimensions (London, 1997). Therefore, the context of the present study is relevant for understanding organizational behavior, as it closely mirrors a context in which employees can acquire feedback about specific managerial competencies upon completion of a computerized assessment instrument (in-basket, 360-degree feedback, assessment center) or when employees consult computerized performance statistics.

Method

Participants

Participants were 126 I/O psychology master's students (88 female, 70%; 38 male) from two consecutive years. They were given extra course credit for their voluntary participation. Participants' mean age was 22.9 years ($SD = 1.8$). No differences were found between participants of the two years on the variables that are included in the study ($p > .05$).

Procedure

We adapted a research paradigm for examining desire for feedback in social psychology to a work-related context (i.e., a context in which people indicate desire for feedback about their performance on a computerized assessment instrument). This research paradigm was created and used by Swann and colleagues (e.g., Swann et al., 1989; Swann, Wenzlaff, Krull, & Pelham, 1992; see also Cassidy, Mehta, & Feeney, 2003). First, participants rated themselves in a self-assessment questionnaire on eight competencies that are included in a recently developed taxonomy of managerial compe-

tence (Tett, Guterman, Bleier, & Murphy, 2000); namely, coordinating, decisiveness, task focus, composure, information management, problem awareness, quantity concern, and trustworthiness. Next, participants worked on a computerized in-basket that simulates daily work activities. Tett, Steele, and Beauregard (2003) developed this computerized in-basket to measure these eight competencies. Completing the computerized in-basket took participants an average of 1 hr. Finally, after completing the in-basket exercise, participants were told that they would have the opportunity to go through a feedback report generated by the computer. However, as there would not be enough time for participants to review the report in its entirety, they were asked to specify those parts that they most wanted to examine (taken from Swann et al., 1989). Next, the measure of desire for feedback was administered (Trope, Gervey, & Bolger, 2003; Trope & Neter, 1994) by asking how interested they were in receiving feedback on each of the eight competencies.

Measures

We adapted the Self-Attribute Questionnaire (SAQ; Pelham & Swann, 1989) to measure participants' uncertainty perceptions. The SAQ was administered prior to the in-basket exercise. The introduction reads as follows: "This questionnaire has to do with your perceptions of your own managerial competencies. For the 8 competencies listed below, you should rate yourself relative to other college students your own age." Next, participants were asked "Now, rate how certain you are of your standing on each on the 8 competencies." Participants reported how certain they were of their standing on each of these competencies on a 9-point scale ranging from 1 (*not at all certain*) to 9 (*extremely certain*). Wording and rating formats for self- and certainty ratings were taken from the SAQ (Pelham & Swann, 1989), which measures similar self-attributes and has shown high test–retest reliability (.77). Mean correlation between participants' self-assessed standing and certainty about these self-assessed standings was moderate ($M = .40$) and was similar to previous research, indicating that self-assessed standing and uncertainty ratings hold relatively well as different constructs (Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Pelham & Swann, 1989).

We used an abbreviated version of the Need for Closure scale (Kossowska, Van Hiel, Chun, & Kruglanski, 2002). We used the 12 items measuring need for specific closure (Neuberg, West, Judice, & Thompson, 1997) with 7-point response scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Internal consistency in the current sample was .81. Previous research has shown

that the Need for Closure scale possesses high test–retest reliability ($r = .86$; Webster & Kruglanski, 1994). A sample item of the Need for Closure scale is "I dislike questions which could be answered in many different ways."

Participants were also administrated a widely used 11-item certainty orientation measure (Brouwers & Sorrentino, 1993; Roney & Sorrentino, 1995). The items were rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Internal consistency in the current sample was .72. In prior research, the scale demonstrated good test–retest reliability ($r = .90$; Walker & Sorrentino, 2000), indicating that certainty orientation is a temporally stable individual-difference measure. A sample item of the certainty orientation scale is "Obedience and respect for authority are the most important virtues children should learn."[4]

The measure of desire for feedback was taken from Trope and Neter (1994; see also Trope et al., 2003). Upon completion of the computerized in-basket, participants were asked "How interested are you in your performance on each of the 8 competencies?" They indicated how interested they were in their performance for each of the eight competencies on a 7-point scale ranging from 1 (*not at all interested*) to 7 (*extremely interested*).

Analyses

The hypotheses were tested with a one-way ANOVA with level of uncertainty as a within-subjects factor and desire for feedback as a dependent variable. The procedure that was followed to make up the within-subjects factor is described in detail in the Appendix. Planned comparisons were conducted to test for competing hypotheses. Tests of the interactions between the individual-difference measures and the within-subjects factor were con-

[4]Confirmatory factor analysis (CFA) with maximum likelihood estimation on the total of 23 items was conducted to test whether the need for closure and certainty orientation constructs are independent. For the CFAs, the samples of the two studies were agreggated ($n = 246$) because large samples typically are needed to conduct meaningful CFAs. Two competing CFA models were tested: a correlated two-factor model with all need for closure items loading on one factor and all certainty orientation items loading on the other factor; and a one-factor model with all 23 items loading on one factor. We used the standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) measures. For these goodness-of-fit measures, Hu and Bentler (1999) proposed the cutoff values of .08 and .06 for SRMR and RMSEA, respectively. CFAs showed that the two-factor model produced an acceptable fit to the data, $\chi^2(229, N = 246) = 460.80$, SRMR = .07, RMSEA = .06. The fit for a one-factor model with all 23 items loading on one factor was not acceptable, $\chi^2(230, N = 246) = 729.22$, SRMR = .09, RMSEA = .09. As a correlated two-factor model yielded an acceptable fit and a one-factor model did not, these findings indicate that need for closure and certainty orientation hold well as independent constructs.

ducted using general linear model procedures in which the individual-difference measures were treated as continuous variables.

Results and Discussion

Preliminary Analyses

We checked how important each of the competencies was to participants on a 9-point scale ranging from 1 (*not important*) to 9 (*very important*). Participants indicated that all eight of the competencies would be potentially important to them ($M = 7.03$, $SD = 1.31$), illustrating that they were interested in knowing more about their standing on each of the competencies. We also disposed of an indication of possible demand characteristics. When they were asked about their general comments after the session, none of the participants in the experimental condition wrote down a comment that was in any way related to the measure of desire for feedback. All comments concerned possible improvements in the task (e.g., fewer items, different layout, items in different order), indicating that people had no suspicions about the study's objective.

Test of Hypotheses

Descriptive statistics, correlations, and internal consistency reliabilities of Study 1 variables are presented in Table 1. We found a significant effect of uncertainty on desire for feedback, $F(2, 236) = 4.34$, $p < .05$, $\eta^2 = .03$. Using planned comparisons, we tested for a linear and a curvilinear trend in the relationship between uncertainty and desire for feedback. No support was found for a linear relationship between uncertainty and desire for feedback, $F(1, 118) = 0.00$, $p > .05$. However, the quadratic contrast was significant, $F(1, 118) = 13.50$, $p < .001$.

As can be seen in Figure 1, people had more desire for feedback about competencies that were held with high uncertainty ($M = 5.79$, $SD = 1.35$) and low uncertainty ($M = 5.78$, $SD = 1.39$), as opposed to competencies that were held with moderate uncertainty ($M = 5.43$, $SD = 1.20$). Although the effect sizes were small (Cohen's $d = .20$, for feedback seeking about high vs. moderate uncertain competencies), paired t tests reveal that desire for feedback about the moderate uncertainty level differed significantly from desire for feedback about both high and low uncertainty levels ($p < .01$), whereas desire for feedback about high and low uncertainty levels did not differ ($p > .05$). Thus, among the three competing hypotheses, the results from this study

Table 1

Descriptive Statistics and Correlation Coefficients: Study 1

	M	*SD*	1	2	3	4
1. Need for closure	3.69	1.02	(.81)			
2. Certainty orientation	3.15	0.79	.37**	(.72)		
3. Desire for feedback HU	5.79	1.35	.09	−.13	—	
4. Desire for feedback MU	5.43	1.20	.07	−.02	.40**	—
5. Desire for feedback LU	5.78	1.39	−.01	−.16	.07	.38**

Note. $N = 119$. Cronbach's alphas are reported in parentheses on the diagonal. HU = high uncertainty, MU = moderate uncertainty, LU = low uncertainty.
**$p < .01$.

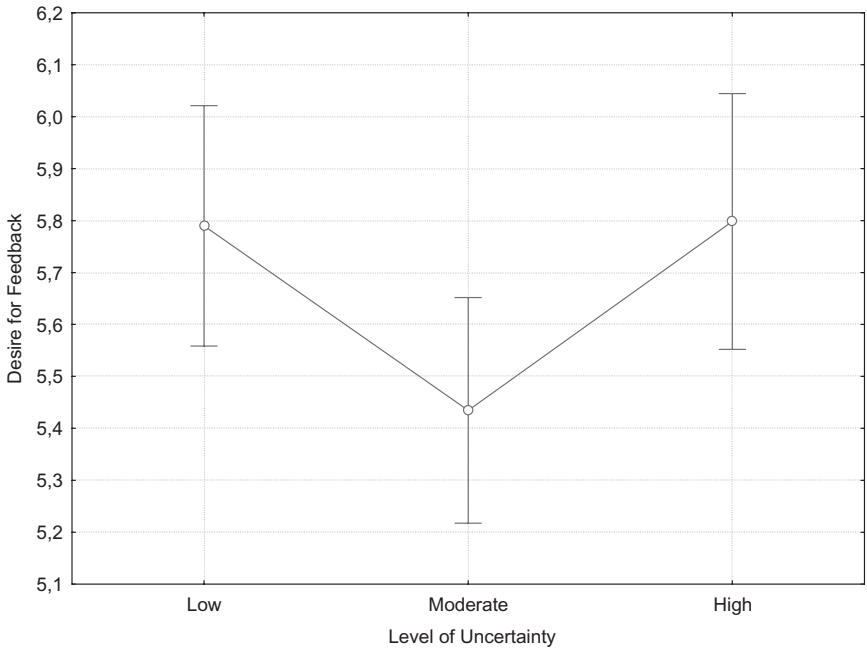

Figure 1. Effect of level of uncertainty on desire for feedback: Study 1

support Hypothesis 1c. Apparently, people have a high desire for feedback about competencies that are held with both high and low uncertainty.[5]

With regard to Hypothesis 2a, no interaction effect was found between need for closure and level of uncertainty, $F(2, 232) = 0.48$, $p > .05$. Also, no interaction effect was found between certainty orientation and level of uncertainty, $F(2, 232) = 0.88$, $p > .05$. So, Hypotheses 2a and 2b were not supported.

Two key findings emerged from Study 1. First, the relationship between uncertainty and desire for feedback was characterized best by a curvilinear relationship. Our results suggest that people seem to desire more feedback when uncertainty is low and when uncertainty is high, reconciling the uncertainty reduction and self-verification theories. Second, this relationship was not moderated by individual-difference variables. In contrast to recent theoretical propositions in social psychology (Sedikides & Strube, 1997), certainty orientation and need for closure did not interact with uncertainty to predict desire for feedback. Still, Study 1 seems to suggest that the traditional positive linear relationship that has been proposed may provide too simplistic a view of the relationship between uncertainty and the desire for feedback.

Study 2

Study 1 provided an appropriate context for testing the relationship between uncertainty and desire for feedback, as there were few contextual influences that could impact on the relationship under study. However, from a more practical perspective, initial desire for feedback constitutes only the first phase of the feedback process. Studies of the entire feedback-seeking process have shown that in different phases of the process (e.g., feedback-seeking intentions, reconsideration of intentions, actual feedback seeking),

[5]As self-assessed standing on the competencies and uncertainty ratings were moderately correlated, it could be argued that the observed curvilinear effect reflects performance expectations, instead of uncertainty. For instance, it is possible that participants merely desired feedback about their best competencies (e.g., for increasing self-worth) and their worst competencies (e.g., for improving performance). Therefore, we also conducted analyses with self-assessed standing included as a second within-subjects factor (also see Pelham, 1989). This analysis yielded the same results for the relationship between uncertainty and desire for feedback. Results concerning self-assessed standing show that people had more desire for feedback about their best ($M = 5.84$) and moderate competencies ($M = 5.66$) than about their worst competencies ($M = 5.10$, $p < .01$), indicating that there was a positive linear relationship between self-assessed standing and desire for feedback. This supports previous research demonstrating that people seek more feedback when performance expectations are high (Morrison & Weldon, 1990). In sum, the curvilinear relationship between uncertainty and desire for feedback seems to be independent of the influence of self-assessed standing on competencies.

several other motives and contextual factors come into play, such as the desire to protect one's ego, the desire to manage impressions, peer reactions, and source supportiveness (e.g., Levy et al., 1995; Levy, Cober, & Miller, 2002; Williams, Miller, Steelman, & Levy, 1999). Previous research has shown that the threat induced by a public context overwhelms initial desire for feedback and leads individuals to modify their feedback-seeking intentions (e.g., Levy et al., 1995).

One might question whether the results concerning the relationship between uncertainty and desire for feedback obtained in Study 1 will generalize to more traditional organizational contexts in which various other motives come into play. Therefore, we decided to examine the hypotheses concerning the relationship between uncertainty and desire for feedback in a field context with actual feedback-seeking behavior as a dependent variable. Therefore, in Study 2, we gathered self-reports of frequency of feedback seeking in a field setting. In line with prior research, we examined two feedback-seeking strategies: feedback inquiry and feedback monitoring. We used a different measure of uncertainty, as compared to Study 1. People were asked to give a general appraisal of perceived uncertainty about appropriate behaviors and potential evaluations in their environments. This was in line with prior field studies, which also employed more global measures of uncertainty (Ashford, 1986; Ashford & Cummings, 1985; Gupta et al., 1999).

Method

Participants and Procedure

Data were collected in a local division of a multinational manufacturer of agricultural machinery. A cover letter discussing the study and containing a link to the actual questionnaire was e-mailed to 438 employees. Study participation was voluntary. Questionnaires were completed by 148 employees (10.2% female), yielding a response rate of 33.8%. Participants' ages ranged from 21 to 59 years ($M = 42.1$ years, $SD = 10.1$). Participants had an average tenure of 19.1 years ($SD = 11.6$) in the company and an average experience of 9.2 years ($SD = 8.5$) in their current positions. In addition, 68.6% held at least an undergraduate degree, and 29.2% of participants had a supervisory or management position.

We examined whether respondents were different from nonrespondents. To this end, we retrieved archival data from the organization on key demographic variables from the target population (all 438 employees who were originally surveyed). The *t* tests for continuous variables and chi-square tests for categorical variables indicate that respondents' means were not signifi-

cantly different from the target population on age ($M = 43.7$ years), gender (9.4% female), and position (28.8% supervisory or management position). Respondents had a significantly shorter tenure than did the target population ($M = 21.6$ yrs., $p < .05$). However, given the small difference in tenure, the response rate did not seem to be a major threat to the representativeness of our results.

Measures

The same measures as in Study 1 were used for need for closure ($\alpha = .73$) and certainty orientation ($\alpha = .81$). For the other variables, we used measures that have been used in prior field-based research about feedback seeking. Specifically, respondents' perceptions of uncertainty about appropriate behaviors and potential evaluations in their organizational environments were assessed with a four-item scale developed by Ashford (1986). The items used 7-point response scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale includes items such as "It is unclear to me exactly what I should do in order to perform my job better." Internal consistency was .76.

Finally, the dependent variable (i.e., actual feedback seeking) was measured with two different scales from Roberson, Deitch, Brief, and Block (2003; see also Ashford, 1986; Ashford & Tsui, 1991; Morrison, 1993; Vande-Walle & Cummings, 1997). Respondents were asked how frequently they engage in various feedback-seeking strategies, using a 7-point scale ranging from 1 (*very infrequently*) to 7 (*very frequently*). A four-item scale measures direct feedback seeking (inquiry) and includes items such as "How frequently do you directly ask your manager for information concerning your performance?" A seven-item scale measures indirect feedback seeking (monitoring) and includes items such as "How often do you observe what behaviors your manager rewards and use this as feedback on your own performance?" As shown in Table 2, internal consistency coefficients for these two measures were good.

As mentioned previously, some studies have found that organizational tenure is related negatively to feedback seeking (e.g., Ashford, 1986), supposedly because experienced employees suffer less from uncertainty. However, several studies have failed to support these findings (e.g., Roberson et al., 2003). Given these previous findings, organizational tenure was included as a control variable in our analyses. It was assessed with a single item that asked participants how many years and months of tenure they had in the organization.

Table 2

Descriptive Statistics and Correlation Coefficients: Study 2

	M	*SD*	1	2	3	4	5	6
1. Tenure	19.14	11.58	—					
2. Uncertainty	4.16	1.30	–.13	(.76)				
3. Need for closure	4.55	0.64	.23**	.03	(.73)			
4. Certainty orientation	4.02	0.88	.23**	–.31**	.39**	(.81)		
5. Frequency of monitoring	3.34	1.04	–.05	–.10	–.11	–.23*	(.84)	
6. Frequency of inquiry	2.41	1.15	–.02	–.35**	.20*	.08	.38**	(.84)

Note. $N = 140$. Cronbach's alphas are reported in parentheses on the diagonal.
*$p < .05$. **$p < .01$.

Results and Discussion

Descriptive statistics, correlations, and internal consistency reliabilities of Study 2 variables are presented in Table 2. To examine our hypotheses, we conducted a hierarchical multiple regression analysis. First, organizational tenure was entered as a control variable. In the second step, perceived uncertainty was entered in the equation. In the third step, we entered the hypothesized quadratic effect of uncertainty to test for a curvilinear relationship between uncertainty and feedback seeking. The fourth step entered the two individual-difference variables. In the fifth step, we entered the interactions between the individual-difference variables and perceived uncertainty. Finally, in the sixth step, we entered the interaction between the individual-difference variables and the curvilinear component of uncertainty.

To minimize collinearity between the main effects of perceived uncertainty, need for closure, and certainty orientation with the interaction terms, we mean-centered the three main effect variables prior to computing cross-product terms (Aiken & West, 1991). The change in R^2, associated with each set of terms, indicated which of the hypotheses were supported in this study. As shown in Table 3, different results were obtained for the two dependent variables. Therefore, the results are reported separately for monitoring (indirect feedback seeking) and inquiry (direct feedback seeking).

Table 3

Hierarchical Regression of Frequency of Feedback Seeking (Inquiry and Monitoring) on Uncertainty, Hypothesized Quadratic Effect, Individual Differences, and Hypothesized Interactions

		Frequency of monitoring					Frequency of inquiry				
		b[a]	*SE (b)*	*t*	*p*	ΔR^2	b[a]	*SE (b)*	*t*	*p*	ΔR^2
Step 1	Organizational tenure	−.01	.01	−0.60	.62	.01	−.01	.01	−1.68	.10	.00
Step 2	Uncertainty	−.12	.09	−1.36	.18	.01	−.26	.08	−3.28	.00***	.14***
Step 3	Uncertainty × Uncertainty	.08	.05	1.62	.10	.04*	.02	.05	0.33	.75	.01
Step 4	Need for Closure	−.45	.23	−1.93	.06	.04	.14	.22	0.65	.52	.03
	Certainty orientation	−.08	.16	−0.51	.61		−.07	.15	−0.44	.66	
Step 5	Uncertainty × Need for Closure	.09	.12	0.78	.44	.01	.03	.11	0.23	.82	.04
	Uncertainty × Certainty Orientation	−.07	.11	−0.68	.50		−.26	.10	−2.57	.01**	
Step 6	Curvilinear Uncertainty × Need for Closure	.11	.08	1.27	.21	.01	.08	.08	0.95	.34	.03
	Curvilinear Uncertainty × Certainty Orientation	−.04	.07	−0.53	.60		.11	.07	1.57	.12	

Note. Parameter estimates are for final step, not entry.
[a]In order to interpret the a priori standardized variables as correctly as possible, the *b* coefficients in this table are unstandardized regression coefficients (Aiken & West, 1991; Jaccard, Turrisi, & Wan, 1990).
*$p < .05$. **$p < .01$. ***$p < .001$.

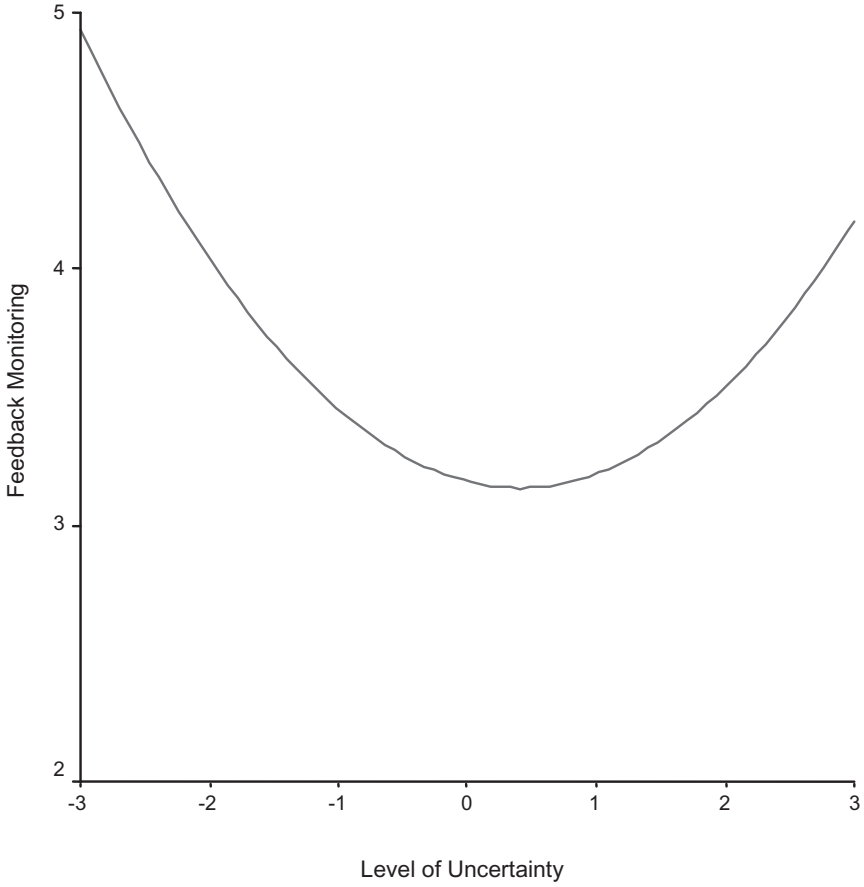

Figure 2. Curvilinear relationship between uncertainty and indirect feedback seeking (monitoring): Study 2

As shown in Table 3, uncertainty was not related to monitoring ($b = -.12$, $p > .05$) and thus explained no significant variance (1%), $F(1, 107) = 0.90$, $p > .05$. Thus, neither Hypothesis 1a nor Hypothesis 1b were supported. The quadratic term, entered in the third step, was responsible for a significant additional variance of 4%, $F(1, 106) = 4.77$, $p < .05$. As can be seen in Figure 2, people sought more feedback when they perceived high levels and low levels of uncertainty in their organization. Yet, they sought less feedback when they perceived intermediate levels of uncertainty. This finding supports Hypothesis 1c and seems to indicate that people satisfy both self-verification and uncertainty-reduction strivings when seeking feedback through monitoring.

The individual-difference variables, which were entered in the fourth step, did not explain any significant additional variance (4%), $F(2, 104) = 2.41$, $p > .05$. The fifth step of the analysis reveals that adding the hypothesized interaction terms did not explain any significant additional variance (1%), $F(2, 102) = 0.48$, $p > .05$. Finally, the sixth step shows that the individual-difference variables did not moderate the curvilinear pattern, $F(2, 100) = 0.83$, $p > .05$. So, Hypotheses 2a and 2b were not supported for indirect feedback seeking.

As shown in Table 3, a different pattern of results arose for inquiry (direct feedback seeking). Uncertainty explained 14% of the variance for inquiry, $F(1, 125) = 19.88$, $p < .001$. Uncertainty was negatively related to inquiry ($b = -.26$, $p < .001$), thus disconfirming Hypothesis 1a and supporting Hypothesis 1b: Employees who perceived higher levels of uncertainty sought less direct feedback. As can be seen in Table 3, entering the quadratic uncertainty term in the equation did not explain any additional variance, $F(1, 124) = 1.57$, $p > .05$. Thus, Hypothesis 1c was not supported for direct feedback seeking. The individual-difference variables, which were entered in the fourth step, did not explain any significant additional variance, $F(2, 122) = 1.85$, $p > .05$.

The fifth step of the analysis reveals that adding the hypothesized interaction terms between the individual-difference variables and perceived uncertainty increased the variance explained by 4%. This additional explained variance of 4% was not significant, $F(2, 120) = 2.75$, $p = .07$. However, caution is needed in interpreting this nonsignificant finding. Detecting reliable moderator effects in field studies is often difficult due to low power (Aguinis, Beaty, Boik, & Pierce, 2005; Aguinis & Stone-Romero, 1997; Zedeck, 1971). Even if interactions are theoretically defensible, large samples will be needed to detect them. Furthermore, controlling first for quadratic effects in the moderated multiple regression can eliminate interactions that are statistically significant (Judd & McClelland, 1989). Indeed, if we did not first control for quadratic effects, but only for the linear effects in the hierarchical multiple regression, the change in R^2 associated with the respective interaction terms was 6% and reached significance, $F(2, 121) = 3.53$, $p < .05$. Therefore, as argued by McClelland and Judd (1993), the increment in R^2 is not the most useful effect-size index in this context. Inspection of the regression coefficients of Table 3 reveals that one of the two hypothesized interaction terms was significant. Certainty orientation moderated the effect of uncertainty on direct feedback seeking ($b = -.23$, $p < .01$).

To determine if this interaction was consistent with our hypothesis, we plotted the overall form from the full equation ± 1 *SD* from the mean of certainty orientation (Aiken & West, 1991). As predicted by Hypothesis 2b, Figure 3 reveals that there was a stronger negative relationship between

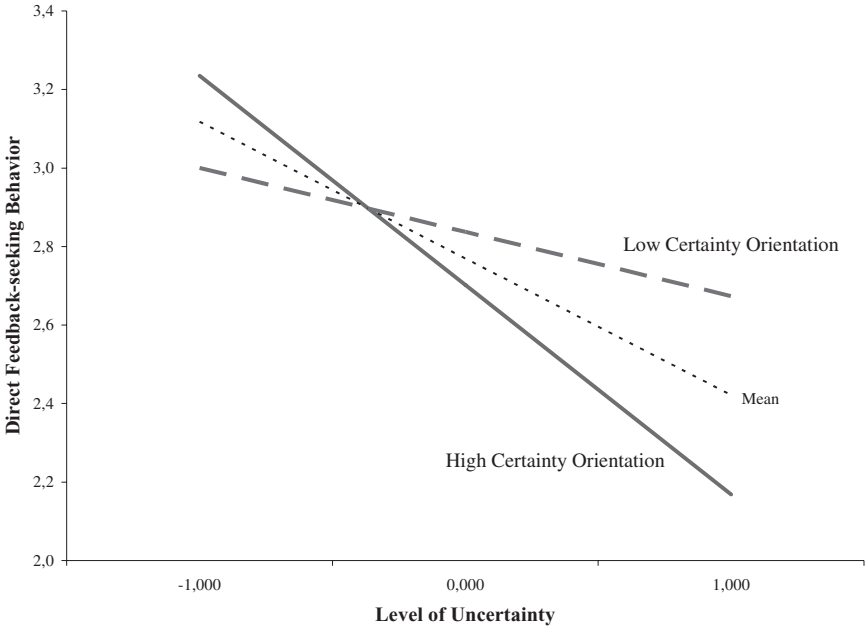

Figure 3. Interaction of certainty orientation and uncertainty on direct feedback seeking (inquiry): Study 2

perceived uncertainty and feedback seeking for individuals with a high certainty orientation. This seems to support the notion that individuals with a high certainty orientation are driven by a self-verification motive and, thus, are more inclined to seek feedback when they experience low levels of uncertainty. For individuals with a low certainty orientation, there is still a small negative relationship between perceived uncertainty and feedback seeking. Finally, in the sixth step, no significant variance (3%) was explained by the interaction effect of the individual-difference variables and the curvilinear component of uncertainty, $F(2, 118) = 2.25$, $p > .05$.

General Discussion

Traditionally, uncertainty reduction has been proposed as the primary motive behind desire for feedback and, by consequence, the primary motive behind the feedback-seeking process (Ashford & Cummings, 1983; Ashford et al., 2003; Morrison, 2002; Morrison et al., 2004). Our study did not invalidate uncertainty reduction as a possible motive behind desire for feedback.

The general conclusion of our two studies is that the relationship between uncertainty and feedback seeking is more complicated than previously thought. Specifically, in both studies, we found evidence for a curvilinear relationship. However, it seems that the different contexts in different stages of the feedback-seeking process may play a crucial role.

Curvilinear Relationship

In Study 1, we found support for a curvilinear relationship between uncertainty and desire for feedback. People had more desire for feedback at low and high levels of uncertainty, as compared to intermediate levels of uncertainty. Research about self-motives in social psychology offers a theoretical framework for understanding these findings: When people find themselves in self-evaluative situations, different motives are activated and guide individuals' information processing. Our results indicate that—apart from the uncertainty-reduction motive—a self-verification motive is activated in the feedback-seeking process. Social psychological research on self-verification processes has shown repeatedly that the more people are certain of specific perceptions, the more they go out of their way to obtain confirmation of those perceptions (e.g., Pelham & Swann, 1994; Swann & Ely, 1984; Swann, Pelham, & Chidester, 1988; Visser, Krosnick, & Simmons, 2003). Apparently, people try to satisfy both uncertainty-reduction and self-verification needs and, therefore, desire feedback when uncertainty is high or low.

This self-verification perspective on the role of uncertainty might shed new light on previous inconsistent findings in the feedback-seeking domain. For instance, Fedor et al. (1992) did not find a significant correlation between feedback uncertainty and feedback monitoring. Similarly, Gupta et al. (1999) reported a nonsignificant relationship between role ambiguity and direct feedback seeking. These scholars tested only for linear relationships, and not for a curvilinear relationship. The simultaneous and opposite activation of both uncertainty-reduction and self-verification motives might have obscured the relationship between uncertainty and feedback seeking in these studies.

Contexts of Different Feedback-Seeking Stages

In Study 2, we focused on a different stage of the feedback-seeking process and studied the relationship between uncertainty and actual feedback seeking, instead of desire for feedback. With feedback monitoring as a depen-

dent variable, the curvilinear relationship with uncertainty was replicated. However, a negative relationship between uncertainty and feedback seeking was found with direct inquiry as dependent variable.

How can these findings be explained? We believe that the context in which feedback is sought might play an important role here. In Study 1, participants could indicate their desire for feedback in a completely private context without having to worry about impression-management concerns. In Study 2, participants were asked to indicate their actual level of indirect feedback seeking. Although the measure in Study 2 clearly targets a different phase of the feedback-seeking process, it shares a common characteristic with the measure in Study 1: By monitoring feedback, participants were able to obtain feedback unobtrusively with no interaction with other individuals required. When people can acquire feedback in such a private context (e.g., by requesting feedback from a computer, as in Study 1; or by monitoring the behavior of others, as in Study 2), face-loss costs and impression-management concerns are minimal for the feedback seeker (Fedor et al., 1992; Levy et al., 1995; Williams et al., 1999). Our results suggest, that in this context, people feel safe to satisfy both uncertainty-reduction and self-verification needs. So, it is possible that the curvilinear relationship between uncertainty and desire for feedback also applies to actual feedback monitoring, as there are little contextual influences that constrain this feedback-seeking strategy.

Another feedback-seeking pattern appeared in Study 2 when people sought feedback by direct inquiry from others. Direct feedback typically is sought in a public context, in which feedback-seeking costs are much higher (Fedor et al., 1992). In that case, a negative relationship between uncertainty and feedback seeking was found. Other researchers have reported negative zero-order correlations between uncertainty and direct feedback seeking (Ashford, 1986; Fedor et al., 1992).

There are two plausible explanations for these findings. First, when people are highly uncertain, they may refrain from seeking feedback through inquiry because they do not know the standards used to judge them, so there is a greater risk to seeking feedback, as the feedback may be negative. Thus, it is possible that for highly uncertain employees, the costs associated with overtly seeking feedback are too high. Another possible explanation is that only a self-verification motive is activated. This would be in line with one of the main tenets of self-verification theory. Self-verification theory assumes that people develop self-confirmatory social environments through social interaction in order to acquire a sense of stability, predictability, and coherence (Swann et al., 2002). For instance, students choose to live with roommates who have confirmed their self-image in the past (Swann, Bosson, & Pelham, 2002). By publicly seeking feedback about self-views that are held with high certainty, employees can convey a clear picture of their core self-views and convince their

bosses and colleagues to see them as they see themselves. As we did not dispose of direct measures of feedback-seeking costs or self-verification motives, these two explanations that might account for the negative relationship between uncertainty and feedback seeking await further research.

Individual Differences as Moderators

Evidence for the moderating role of individual-difference variables in the relationship between uncertainty and feedback seeking was limited. No moderating effects were found in Study 1. In Study 2, we found a moderating effect of certainty orientation with direct feedback seeking (inquiry) as a dependent variable. This finding suggests that people with high certainty orientation seek more direct feedback when they are certain than do people with low certainty orientation. Apparently, people with high certainty orientation are more driven by self-verification strivings than by uncertainty reduction strivings.

Recently, several scholars have examined how various self-motives interact to guide behavior (for a review, see Sedikides & Strube, 1997). Yet, these studies have focused on identifying situational moderators (e.g., Dunning, 1995; Sedikides et al., 2002; Tice et al., 1995) that might reconcile the activation of different motives in self-evaluative situations. The current research is among the first to examine if the activation of the uncertainty reduction (self-assessment) and self-verification motive is moderated by individual-difference variables. However, given the limited evidence of the moderating role of individual-difference variables in the present research, more study is needed in this domain.

We believe that the study of individual-difference variables can be a fruitful avenue for studying the interplay between various seemingly conflicting self-evaluation motives. So far, most feedback-seeking research has addressed how different motives might affect feedback seeking separately. Yet, more study is needed to investigate how those motives work in concert (see Ashford et al., 2003; Morrison, 2002). Research on self-motives in social psychology might provide a well suited theoretical framework for studying this interplay and outlining other individual-difference variables (e.g., self-consciousness; Sedikides & Strube, 1997).

Practical Implications

Our findings suggest that the widespread notion that employees desire feedback to reduce uncertainty and to improve performance is not completely accurate. This has practical implications for organizations and for individuals.

Organizational Implications

From an organizational point of view, this insight is troubling. When individuals' desire for feedback is guided by a self-verification motive, the effects could be detrimental for individual and organizational performance. According to Kluger and DeNisi's (1996) feedback intervention theory, the effectiveness of any feedback depends on where the feedback intervention focuses one's attention. When attention is focused on the task (e.g., tasks on which the person needs to improve) individuals focus on shrinking the gap between their actual performance and their performance goals. Alternatively, when feedback focuses attention on the self, (e.g., how a person views his or her self-image or self-concept), feedback interventions often produce strong affective reactions that can interfere with task performance. Thus, feedback seeking that is driven by self-verification can divert attention away from the task to questions of who we really are, resulting in a decrease in performance (Kluger & DeNisi, 1996).

Organizations might consider looking for strategies to deal with the possible negative effects of feedback seeking that is driven by self-verification. For example, managers could be made aware of self-verifying tendencies and could be trained and encouraged to provide additional feedback about ambiguities in times of increased uncertainty (i.e., crisis, change, mergers, and socialization periods). Furthermore, in order to promote feedback interest that is aimed directly at uncertainty reduction and performance improvement, organizations should try to identify factors that may influence feedback-seeking motives.

DeNisi and Kluger (2000) proposed that normative feedback should be avoided because it directs attention to ego motives, which makes a decline in performance more likely. Supervisors and managers could pay more attention to the self-verification strivings of employees in day-to-day informal conversations. When self-verification needs are already fulfilled in these low-stakes interactions, chances are that uncertainty-reduction needs gain the upper hand when a feedback-seeking opportunity presents itself. Finally, employees can be trained in seeking feedback about uncertainty by emphasizing the benefits of feedback as a tool for self-development. This might help employees to overcome their natural proclivity toward seeking feedback in a biased way (Larson, 1989).

Individual Implications

From an individual point of view, our results highlight the importance of feedback seeking as a self-regulation strategy for employees in their organi-

zational environments. Whereas previous research mainly described feedback seeking as a means of increasing individual and organizational performance, the present research suggests that employees also use feedback seeking as a strategy to increase individual well-being. This was illustrated in recent work by Swann and colleagues (Swann, Rentfrow et al., 2002), showing that people who acquired a sense of coherence through self-verifying strategies demonstrated higher levels of psychological and physical health. Thus, by seeking feedback when experiencing low levels of uncertainty, employees can increase feelings of control and stability in their social environments.

However, these self-verifying tendencies do not have to lead to rigidity. As illustrated in the present studies, when people experience high levels of uncertainty, they will seek feedback to reduce this uncertainty. So, it seems that individuals use feedback seeking as a subtle, self-regulatory strategy to find a balance between their personal need for coherence and the need for reducing uncertainty that is caused by changes in organizational environments.

Limitations

A reason for conducting two studies was to address the weaknesses inherent in the use of any single research design. When two studies in different contexts are combined in one investigation to test the same hypotheses, the strengths of one study can help compensate for the weaknesses of the other (Sackett & Larson, 1990). Nevertheless, limitations to the present research should be considered.

In Study 1, participants were students, not employees, and could indicate their desire for feedback on a computer. Although we ensured that the task was realistic and important to the participants (see importance ratings in Study 1), this study lacks contextual realism in comparison to an organizational setting in which employees can seek actual feedback from different sources, and feedback-seeking costs and impression-management concerns come into play.

Another limitation is that in the field study, we collected data at a single point in time from a single source, which introduces the possibility of common method variance. Although common method bias is an unlikely explanation for results that are convergent across the two studies, the effects of such bias cannot be ruled out.

A third limitation is that we had no self-report measure of the different motives driving feedback seeking in comparison to previous research (Tuckey et al., 2002). However, research has shown that the use of self-report

measures is not the best method to assess more implicit motives of behavior (McClelland, Koestner, & Weinberger, 1989; Winter, John, Stewart, Klohnen, & Duncan, 1998). Therefore, we inferred the activation of uncertainty-reduction and self-verification motives from participants' feedback seeking.

A final concern is that the two studies presented here differed on a number of important characteristics (e.g., participants, methods, measures, design). For instance, in Study 1, we examined self-related uncertainty; while in Study 2, we measured task-related uncertainty. This may limit the conclusions that can be drawn regarding the similarity of findings across studies. The conclusions that are presented here should be taken with caution and await further research. It is plausible that the relationship between uncertainty and the desire for feedback depends on the nature of the uncertainty that is assessed (self vs. task).

Feedback seeking has been identified as one of the main self-regulation strategies of employees in organizations. The present research tested various theoretical perspectives that might explain the relationship between uncertainty and the desire for feedback. We found that people could be motivated by both uncertainty-reduction and self-verification strivings. Future research along these lines is needed to understand better how the various motives work in concert in the feedback-seeking process.

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Appendix

Analytical Procedure

In this study, we adopted a within-persons perspective to examine desire for feedback from the frame of reference of the feedback seeker. An

example might help to illustrate the specific analytic approach that was adopted for the research question under study. Consider a student who has an opportunity to seek feedback after completing a management test. Let us assume that on a 9-point scale with a theoretical mean of 5, the average uncertainty rating for college students is 7 for their decisiveness and 3 for their problem awareness. Now, consider a student who rates his or her uncertainty about decisiveness as a 6 (above the scale mean, but below the group average) and problem awareness as a 4 (below the scale mean, but above the group average). About which competency should this student seek feedback to reduce uncertainty? From the researcher's perspective (between-subjects approach), he or she should seek feedback about problem awareness because he or she is more uncertain about this competence than the group average, whereas his or her uncertainty about decisiveness is below the group average. However, from the student's perspective, he or she is most uncertain about decisiveness and thus to reduce uncertainty, he or she should seek feedback about this competency.

A specific analytic procedure to examine feedback-seeking decisions from the perspective of the participants was developed by Pelham (1989) and adopted in this study (also see Cassidy et al., 2003; Pelham, 1993; Pelham & Swann, 1994; Swann et al., 1989). For each participant, the competency that received the highest certainty rating, the competency that corresponded with a median certainty rating, and the competency that received the lowest certainty rating were selected. For instance, consider 3 participants whose highest, median, and lowest ratings of certainty were 9-5-1 (Participant 1), 9-8-7 (Participant 2), and 3-2-1 (Participant 3), respectively. The high certainty level would have received a rating of 9, 9, and 3 from these participants. The moderate certainty level would have received a rating of 5, 8, and 2 from these three participants; and the low certainty level would have received a rating of 1, 7, and 1 from these participants. As can be noted in this example, not all 3 participants have a low degree of certainty for their most uncertain competency. Still, for each participant, the competency that was selected as most uncertain was the competency that received the lowest certainty rating from their own frame of reference. Accordingly, for each subject, we identified a *least uncertain* ($M = 7.05$, $SD = 1.20$), a *moderate uncertain* ($M = 5.78$, $SD = 1.29$), and a *most uncertain* ($M = 3.83$, $SD = 1.42$) competency, as the three levels of the within-subjects factor Level of Uncertainty. Only the feedback-seeking ratings for these three competencies (which may be different for each participant) were used in the analyses. If more than one competency qualified as a participant's most, moderate, or least uncertain competency, we consulted group norms (Pelham, 1991).

Note that randomly selecting one of the competencies that qualified as a participant's most or least uncertain competency (see Cassidy et al., 2003) yielded the same results as did consulting group norms. Mean uncertainty ratings for the three selected competencies for each participant differed significantly from each other ($p < .001$), indicating that the uncertainty manipulation was successful.